

## ABSTRACT

A CMOS imager includes an array of active pixel sensors, wherein each pixel is associated with a respective column in the array. The imager also includes multiple circuits for reading out values of pixels from the active sensor array. Each readout circuit can be associated with a respective pair of columns in the array and can include first and second sample-and-hold circuits. The first and second sample-and-hold circuits are associated, respectively, with first and second columns of pixels in the array. Each readout circuit also includes an operational amplifier-based charge sensing circuit that selectively provides an amplified differential output signal based on signals sampled either by the first sample-and-hold circuit or the second sample-and-hold circuit. The readout circuit also has an analog-to-digital converter for converting the differential output to a corresponding digital signal using a successive approximation technique. Use of the readout circuit can increase the parallel structure of the overall chip, thereby reducing the bandwidth which each readout circuit must be capable of handling.